for giving me every facility for working in his department of the British Museum (Nat. Hist.).

EXPLANATION OF THE PLATES.

Plate XII.

Fig. 1. Inner side of the posterior part of the second and anterior part of the third right lower molars of *Elephas creticus*. (M. 9383*a*.) $\frac{3}{4}$ nat. size.
2. Unworn plates of a molar of *E. creticus*. (M. 9379.) Nat. size.
3. Crown view of right lower third molar of *E. creticus*. (M. 9381.) $\frac{3}{4}$ nat. size.

Plate XIII.

Fig. 1. Crown and (1 *a*) side views of second lower molar of *E. creticus*. (M. 9378.) $\frac{3}{4}$ nat. size.
2. Crown view of second upper molar of *E. creticus*. One of the plates has been restored. (M. 9377.) $\frac{3}{4}$ nat. size.
3. Crown view of the first and second right lower molars (or last milk-molar and first molar) of *Elephas antiquus* Falconer. (M. 9384.) $\frac{3}{4}$ nat. size.

(The numbers of the specimens are those in the British Museum register.)

3. Zoological Results of the Third Tanganyika Expedition, conducted by Dr. W. A. Cunnington, 1904–1905.—Report on the Polyzoa. By Charles F. Rousselet, F.R.M.S.

[Received February 2, 1907.]

(Plates XIV. & XV.*)

The freshwater Polyzoa collected in Lake Tanganyika by Dr. W. A. Cunnington are attached to stones and shells which were partly obtained in shallow water and partly dredged from 20 to 40 fathoms.

Altogether the collection contains five species, three of which belong to the Phylactolæmata and two to the Gymnolæmata. Amongst the latter is Moore's *Arachnoidia ray-lankesteri* (10†), which was found in some abundance on shells of *Paramelania* dredged from deep water.

Two species of the Phylactolæmata are of the *Plumatella* type, with horseshoe-shaped lophophore. One of these appears to be a new species, very closely adherent to stones, with half-formed ⊂-shaped tubes, which I have named *Plumatella tanganyikæ*.

To the second species I have given no name, as the few fragments of tubes and the total absence of statoblasts offer no characters that would distinguish it from *Plumatella repens*.

The third Phylactolæmatous specimen is an interesting new species of the genus *Fredericella*, which I have named *Fredericella cunningtoni* in honour of its discoverer, who dredged it from 25 fathoms near Mshale.

The second of the Gymnolæmatous species is of special interest, as being always found associated with, and imbedded in, a fresh-

* For explanation of the Plates, see p. 257.
† The numbers refer to the Bibliography, pp. 256, 257.

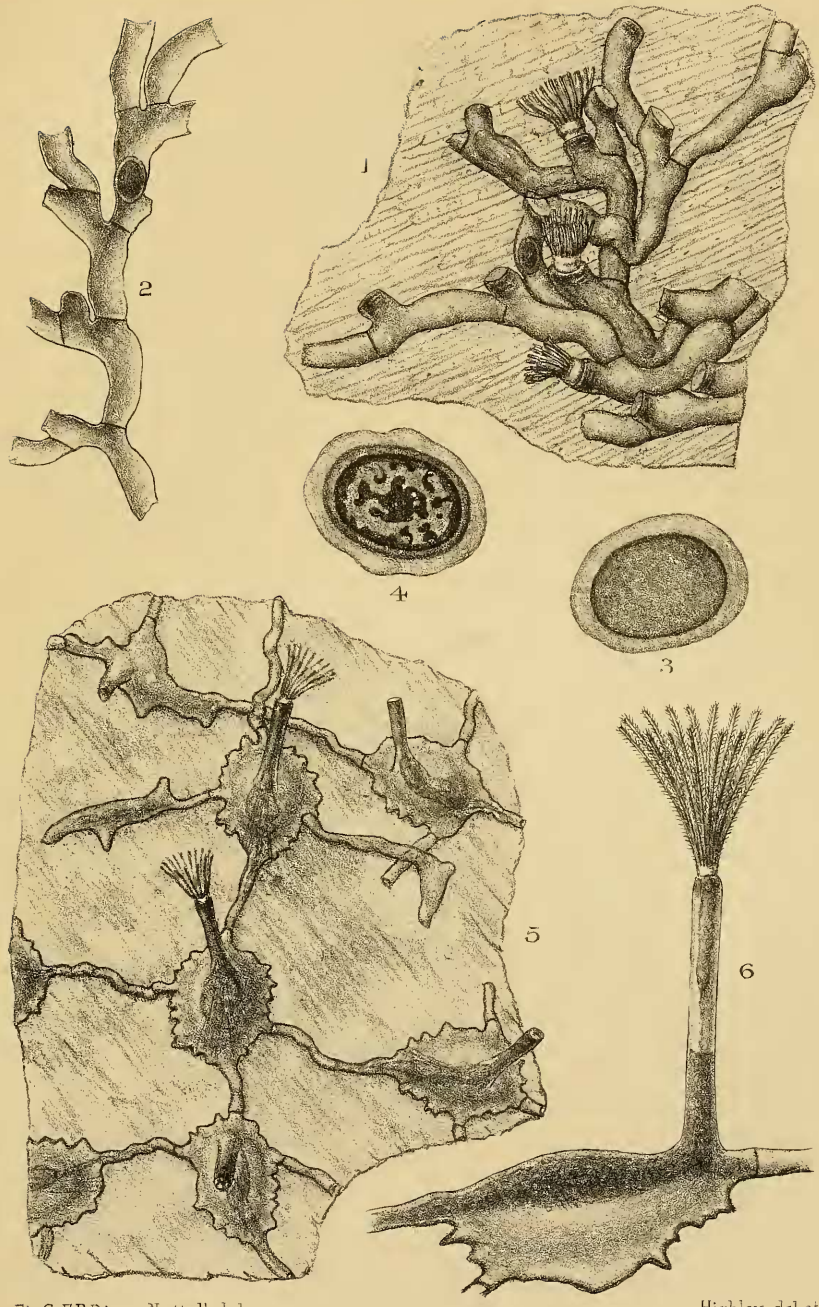
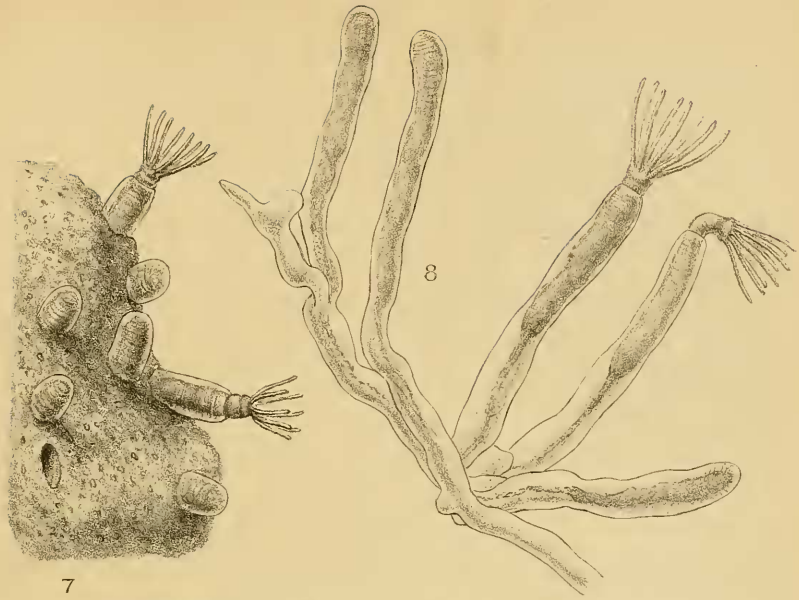


Fig 6. F. R. Dixon-Nuttall. del. Highley, del et lith.

TANGANYIKA POLYZOA.



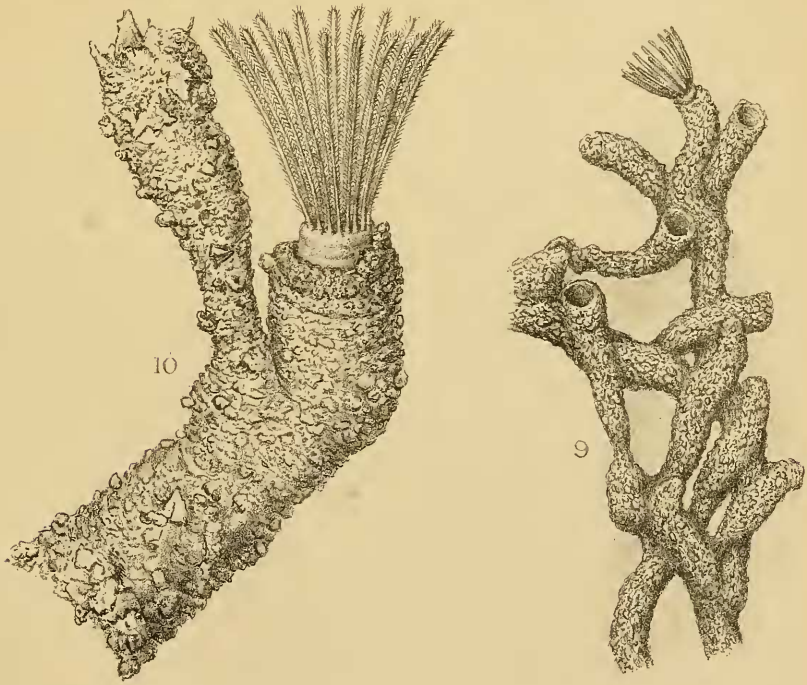


Fig. 10. F. R. Dixon-Nuttall, del.

Highley del et lith.

TANGANYIKA POLYZOA.

water sponge, *Spongilla tanganyikæ* Evans, only the small heads projecting beyond the surface of the sponge. Its affinities appear to approach nearest to *Victorella*, and I have therefore named it *Victorella symbiotica*.

The following is a list of the five species here described :—

1. *Plumatella tanganyikæ*. sp. n.
2. ,, *repens*, var. ?
3. *Fredericella cunningtoni*, sp. n.
4. *Arachnoidia ray-lankesteri* Moore.
5. *Victorella symbiotica*, sp. n.

The number of known species of Polyzoa inhabiting African fresh waters is thus brought up to eight, truly a remarkably small number for this vast continent.

The other African species so far recorded are the following :—

Fredericella sultana, found by Dr. Stuhlmann in Alexandria, Egypt (**7**), and in the Equefa River, Natal, by the Hon. Thos. Kirkman *.

Plumatella repens, var., from Ugogo, Victoria Nyanza, Albert Edward Nyanza, and Albert Nyanza : the statoblasts only found by Dr. Stuhlmann (**7**) and also by Dr. Meissner on shells of *Ætheria* (in the Berlin Museum) from the Upper Nile, White Nile, the Niger, and Senegal (**8**, **9**).

Lophopodella (*Pectinatella*) *carteri* Hyatt, from Ugogo : statoblasts found by Dr. Stuhlmann (**7**).

Lophopodella thomasi Rouss., from Hunyani River, Rhodesia (**12**).

The indifferent preservation of the Tanganyika specimens has unfortunately hampered and prevented a complete study of all the species. They were narcotised with cocaine and then preserved in alcohol, which is not a sufficiently good fixative for these animals. Freshwater Polyzoa must not be allowed to die in the anæsthetic, which quickly macerates their delicate bodies. After treatment with cocaine in perfectly clean water they should be killed and fixed whilst still living, either with very weak osmic acid ($\frac{1}{10}$ per cent.) for ten minutes to half an hour, according to the age and actual strength of the solution, then washed, and also preserved, in 3 per cent. commercial formalin (97 c.c. water, 3 c.c. formalin); or else fixed with a 10 per cent. solution of formalin (90 c.c. water, 10 c.c. formalin) for 24 hours, then preserved in 3 per cent. formalin to which $\frac{1}{2}$ per cent. glycerine may be added to render the animals more transparent. Polyzoa fixed with osmic acid are stained brown, or even black, if allowed to stay too long in the fixative; those fixed with formalin remain white and transparent.

The little bottles in which the preserved specimens are stored should have no air-space; an air-bubble plays havoc with the delicate tentacles of extended polypides.

* Mentioned in his paper on the Rotifera of Natal as supporting tubes of *Limnias ceratophylli*: Journ. Roy. Micr. Soc. 1901, p. 232.

With regard to the question of the origin of the freshwater Polyzoa, I am inclined to agree with Dr. Wesenberg-Lund (13), who has expressed the view that all the different groups have wandered from the sea, the Phylactolæmata at an early period, so that their marine ancestors are not now known, and may have become extinct in the sea long ages ago, whilst the freshwater Gymnolæmata, i. e. *Paludicella*, *Victorella*, *Pottsiella*, *Arachnoidia*, have immigrated at a much later period, so that they still show some affinity with several marine genera.

If this conception be correct, it follows that there can be no relationship between the living Phylactolæmata and Gymnolæmata, and still less can there be intermediate forms connecting the one with the other.

In June of last year I succeeded, with the kind assistance of Dr. Bousfield, in again finding *Victorella pavida* in the Surrey Canal, London, where it had been obtained some twenty years ago, but not recorded since. A study of this species and of the other known freshwater Gymnolæmata has impressed upon me that, in addition to the absence of statoblasts, they are all possessed of a common character of considerable importance, which they share with a group of marine Ctenostomata, and which may well denote a certain degree of affinity. In all these forms there is a stolon which expands into a cell or zoœcium, at the upper end of which an orifice is formed which may become enlarged into an elongated, more or less cylindrical tube for the protrusion of the polypide. Behind the orifice the stolon, after forming a septum, continues to grow out to form another cell a little further on; then on each side of the cell normally one additional stolon arises, also separated by a septum, to form new branches, which repeat the same process of cell-formation until the growing point of the stolon is either broken off or becomes atrophied. In this way a zoarium is produced, forming an irregular network of branches, approximately at right angles to each other. This cruciform mode of growth can readily be observed in all the species of the following genera, which might be grouped together under the name of "Cruciform Stolonifera":—

Paludicella. *Victorella.* *Pottsiella.* *Arachnoidia.*	Freshwater.
Arachnidium. *Cylindrœcium.*	Marine*.

Plumatella tanganyikæ, sp. n. (Plate XIV. figs. 1–4.)

Specific Characters.—Zoarium consisting of clear light brown chitinous tubes, branching, curving, and interlacing, closely

* The marine species *Barentsia misakiensis* from Japan, described by Dr. A. Oka in 1895, shows the same fundamental structure.

adherent, encrusting stones, in the substance of which they are partly embedded; also encrusting shells of molluscs; tubes sometimes flat-sided. Tentacles about 20. Sessile statoblasts oval; floating statoblasts not observed.

The appearance of this new *Plumatella* is very different from the European species and varieties of the genus, as will be seen by figs. 1 & 2, Pl. XIV.

The tubes form a thin, closely adherent, interlacing, encrusting layer, and are partly embedded in the stone on which they grow; or, possibly, stony crystalline material has been deposited in between and over the tubes. The tubes encrusting stones are fairly tubular, but those encrusting molluscan shells are flat-sided or ⊖-shaped in section, and the adhering side has only a very thin layer of chitinous material, so that the supporting shell is used by the animal to form part of its protecting tube. The tubes are of a light brown colour, clear and nearly transparent. The raised ends of the tubes are always tubular and white. Septa are present in the tubes at the points of branching.

A full and well-extended head was not found; but there is every appearance that the lophophore is horseshoe-shaped, with about 20 tentacles.

Sessile statoblasts were found in the tubes (Pl. XIV. figs. 3 & 4); they are oval in shape, but varying a good deal in their proportions of width to length, smooth, and surrounded by a thin, narrow, flat annulus without air-cells; their greatest size is: length 450 μ ($\frac{1}{56}$ in.), width 343 μ ($\frac{1}{74}$ in.). Ordinary floating statoblasts with swimming annulus were not observed.

Diameter of tubes 321 μ ($\frac{1}{79}$ in.) on average.

Habitat. Encrusting stones just below water-level at Kalambo and Kassanga; and also encrusting shells in shallow water at Chamkaluki.

Plumatella repens, var. ?

This specimen was found attached to shells of living *Tiphobia*, dredged from about 40 fathoms at Maswa.

The tubes are brown in colour, semi-opaque, and show a deposit of fine material in more or less regular longitudinal or transverse lines; they are partly adherent, branching irregularly, tubular, and altogether have much resemblance to those of *Plumatella repens* of our lakes and canals, from which it is hardly possible to differentiate them.

Fully extended specimens were not present, but the lophophore appears to have about 22 to 24 tentacles.

The diameter of the tubes is 364 μ ($\frac{1}{69}$ in.) on average.

Some sessile statoblasts found in the tubes are oval, smooth, with thin flat annulus without air-cells, 407 μ ($\frac{1}{62}$ in.) in length and 278 μ ($\frac{1}{91}$ in.) in width. Floating statoblasts with cellular annulus were not observed.

The tubes are larger, and the sessile statoblasts smaller and more elongated, than in the preceding species.